Mr. Michael T. Davis Pre-Calculus	2.7 Solving Equations with Rational Expressions (1) December 19, 2016

Name: Solutions

1. Solve $\frac{10}{21}=\frac{5}{16y}$

$\frac{2}{21}=\frac{5}{16y}$ $\quad 32y=105$ $\quad y=\frac{105}{32}$

$\left\{\frac{105}{32}\right\}$

2. Solve $\frac{2n-3}{5}=\frac{n+2}{6}$

$\cancel{30}^{6}\cdot\frac{2n-3}{\cancel{5}}=\cancel{30}^{5}\cdot\frac{n+2}{\cancel{6}}$

$6(2n-3)=5(n+2)$

$12n-18=5n+10$

$7n=28$

$n=4$ $\quad \{4\}$

3. Solve $\frac{3c}{10}+\frac{c}{5}=\frac{3}{2}$

$\cancel{10}^{1}\cdot\frac{3c}{\cancel{10}}+\cancel{10}^{2}\cdot\frac{c}{\cancel{5}}=\cancel{10}^{5}\cdot\frac{3}{\cancel{2}}$

$3c+2c=5\cdot 3$

$5c=15$

$c=3$ $\quad \{3\}$

4. Solve $\frac{4y+1}{3}-\frac{2y+1}{5}=\frac{3}{5}$

$\cancel{15}^{5}\cdot\frac{4y+1}{\cancel{3}}-\cancel{15}^{3}\cdot\frac{2y+1}{\cancel{5}}=\cancel{15}^{3}\cdot\frac{3}{\cancel{5}}$

$5(4y+1)-3(2y+1)=3\cdot 3$

$20y+5-6y-3=9$

$14y+2=9$

$14y=7$

$y=\frac{7}{14}$ $\quad \left\{\frac{1}{2}\right\}$

5. Solve $\frac{3x-18}{x-6}=3$

$(x-6)\frac{3x-18}{x-6} = (x-6)\cdot 3$

$3x-18 = 3x-18$

$0 = 0$

{All real numbers, $x \neq 6$}

6. Solve $\frac{4x-20}{x-5}=3$

$(x-5)\frac{4x-20}{x-5} = (x-5)\cdot 3$

$4x-20 = 3x-15$

$x = 5$

$x \neq 5$ no solution

7. Solve. $\frac{1}{4}=\frac{2w+1}{4+3w}$

$4(4+3w)\frac{1}{4} = 4(4+3w)\frac{2w+1}{4+3w}$

$4+3w = 4(2w+1)$

$4+3w = 8w+4$

$0 = 5w$

$0 = w$ {0}

8. Solve. $\frac{4}{y+1}-\frac{1}{y}=1$

$y(y+1)\frac{4}{y+1} - y(y+1)\frac{1}{y} = y(y+1)\cdot 1$

$4y - (y+1) = y^2+y$

$4y-y-1 = y^2+y$

$0 = y^2-2y+1$

$0 = (y-1)^2$

$y = 1$ {1}

9. Solve $\frac{5}{x}+\frac{4}{x+1}=7$

$x(x+1)\frac{5}{x} + x(x+1)\frac{4}{x+1} = x(x+1)\cdot 7$

$5(x+1) + 4x = 7x(x+1)$

$5x+5 + 4x = 7x^2+7x$

$0 = 7x^2-2x-5$

$0 = (7x+5)(x-1)$

$7x+5=0 \quad x-1=0$

$x=-\frac{5}{7} \quad x=1$

$\left\{-\frac{5}{7}, 1\right\}$

10. Solve $x+2=\frac{15}{x}$

$x\cdot x + x\cdot 2 = x\cdot\frac{15}{x}$

$x^2+2x=15$

$x^2+2x-15=0$

$(x+5)(x-3)=0$

$x=-5 \quad x=3$

$\{-5, 3\}$

11. Solve $\frac{x+1}{5}-\frac{3}{2}=\frac{3x-6}{10}$

$2\cdot\frac{x+1}{5} - 5\cdot\frac{3}{2} = 10\cdot\frac{3x-6}{10}$

$2(x+1) - 5\cdot 3 = 3x-6$

$2x+2-15 = 3x-6$

$2x-13 = 3x-6$

$-x-13 = -6$

$-x = 7$

$x=-7$

$\{-7\}$

12. Solve $\frac{3}{x-1}+\frac{2}{x}=4$

$x(x-1)\frac{3}{x-1} + x(x-1)\frac{2}{x} = x(x-1)\cdot 4$

$3x + 2(x-1) = 4x(x-1)$

$3x+2x-2 = 4x^2-4x$

$5x-2 = 4x^2-4x$

$0 = 4x^2-9x+2$

$0 = (4x-1)(x-2)$

$4x-1=0 \quad x-2=0$

$x=\frac{1}{4} \quad x=2$

$\left\{\frac{1}{4}, 2\right\}$